APPENDIX F

WILDLIFE RESOURCES INFORMATION

FISH AND WILDLIFE RESOURCE INFORMATION

Andalex Resources, Inc. - Tower Division

(Wildcat Coal Loadout)

General Wildlife Information

Wildlife Diversity and Status

The coal loadout area (Section 33, T13S, R9E) encompasses sagebrush/grass and pinion/juniper ecosystems adjacent to the Gordon Creek Wildlife Management Area. These ecosystems lie along the base of the east side of the Wasatch Plateau in Carbon County, Utah. The Wasatch Plateau is an expansive and diverse biogeographic area (Area A identified in Appendix A) that could be inhabited on occasion or during different seasons of the year by 364 species of vertebrate wildlife. From this assemblage, 168 species (no picinian, no amphibian, 16 reptilian, 101 avian and 51 mammalian species) are likely inhabitants of the coal loadout area. It is interesting to note that 98% of the species associated with the project are protected -- of these 34 species are of high interest to the state of Utah.

The Division Publication No. 78-16 "Species List of Vertebrate Wildlife That Inhabit Southeastern Utah" is appended (Appendix A) to this report. It identifies those species having potential to inhabit Southeastern Utah and the Biogeographic Area (Area A), that surrounds the project. Those that are believed to inhabit the environs of the loadout area are denoted in Appendix A with an explanation mark (!). Appendix A also identifies individual species that are protected and/or considered to be of high interest (*) as well as

their relative abundance, population trend and generalizations concerning habitat use areas.

Ecosystems and Their Relative Biological Value

Ecosystems

The coal loadout facility lies within a submontane setting adjacent to the Gordon Creek Wildlife Management Area. The project site is comprised of pinion/juniper and sagebrush/grass ecosystems lying between an elevation of 6,120 feet and 6,240 feet.

Qualitative Ranking

A map-overlay (1:250,000 scale) denoting rankings of use areas for individual high interest species is not necessary, since all of the projects surface facilities lie within critical valued deer and elk winter range. The legal section of land (Section 33, T13S, R9E) associated with the loadout project has been ranked as being of critical biological value to the local areas total wildlife resource.

Critical valued ecosystems or wildlife use areas are followed in respective importance by high-priority, substantial and limited valued areas. Without question, man and his facilities can co-exist with most wildlife as long as sufficient water, food, cover and space are provided for the animals. This can be accomplished through development and implementation of a wildlife mitigation plan.

Critical valued wildlife use areas routinely evidence unusually high concentrations of wildlife. Such areas are deemed to be "sensitive" and necessary to sustain the existence and perpetuations of one or more species during crucial time periods in their life cycles. Biological intricacies dictate that significant disturbances cannot be tolerated by the members of an

ecological assemblage on critical valued sites. Professional opinion is that disturbance to critical use areas or habitats will result in unacceptable changes in biota and/or biological productivity of an area. All stream sections, lakes, reservoirs or ponds identified by Utah Division of Wildlife Resources as Class 1 or 2 are ranked as being of critical value. One for one in kind mitigation is expected for impacts in critical areas.

High priority valued wildlife use areas often times experience "intensive use" by one or more species of wildlife. This may occur during crucial time periods in their life cycles. All stream sections, lakes, reservoirs or ponds identified by Utah Division of Wildlife Resources as Class 3 are ranked as being of high priority value. Disturbance to high priority use areas is unreasonable without acceptable mitigation.

Substantial valued wildlife use areas are an "existence" or distribution area for one or more species of wildlife. All stream sections, lakes, reservoirs or ponds identified by Utah Division of Wildlife Resources as Class 4 are ranked as being of substantial value. Disturbance to such areas may require mitigation beyond the mere obligation of reclamation.

Limited valued wildlife use areas are "inhabited occasionally" by one or more species of wildlife. All stream sections, lakes, reservoirs or ponds identified by Utah Division of Wildlife Resources as Class 5 or 6 are ranked as being of limited value. Disturbance to these areas seldom require mitigation beyond reclamation.

Wildlife Use Area

Aquatic Use Areas and High Interest Species

Drainages on the project area are all intermittent. It is only after 8 miles of dry wash that they would reach the perennial flow of the Price River. The Price River, after flowing over 90 miles, discharges into the

Green River. It is important to note that no species of fish inhabit the mine plan or adjacent areas. The endangered humpback chub, bonytail chub and Colorado squawfish inhabit the Green River. Additionally, the razorback sucker, a rare species that may someday be listed as threatened, also inhabits the Green River.

Terrestrial Use Areas and High Interest Species

Seeps and springs, natural water tanks, stock ponds or other manmade watering facilities are not known to exist on the project area. Regardless, all environmentally free water represents a critical valued resource for most wildlife associated with the area.

Five species of amphibians, all of which are protected, are believed to inhabit the environs that surround the project area (Appendix A). Due to the arid nature of the loadout area, none are expected to inhabit it. Note that no amphibians in Utah have relative abundances so low as to have caused them to be federally listed as threatened or endangered.

Sixteen species of reptiles, all of which are protected, are believed to inhabit the project area (Appendix A). The following synopsis portrays the life requisites of just high interest reptiles. No reptiles have relative abundance so low as to have caused them to be federally listed as threatened or endangered.

The milk snake is a yearlong resident of the project area. Its substantial valued use area encompasses all ecosystems except the alpine. The milk snake is primarily subterranean and extremely secretive. When active it is mostly nocturnal. The milk snake feeds on small rodents, lizards and other small snakes. Occasionally, the milk snake may take small birds or bird eggs.

The milk snake may live beyond twenty years and it becomes sexually mature during its third spring season. After mating, which occurs during spring or early summer when they are leaving the den, female milk snakes produce clutches

which average seven eggs. The eggs are secreted in a moist warm environ and then abandoned; incubation lasts 65 to 85 days. The site where an individual snake has deposited its clutch of eggs is of critical value to maintenance of the species.

The Utah mountain kingsnake is a yearlong resident of the project area. Its substantial valued use area encompasses all of the projects ecosystems. Little is known concerning this animal except that it frequents areas of dense vegetation and that it is often found near water. Its life history and food habits parallel that described for the Utah milk snake.

To date snake dens, which are protected and of critical value to snake populations, have not been identified on or adjacent to the project area. It is important to note that inventory for such has not been attempted.

One hundred one species of birds, all of which are protected, are believed to inhabit the project area. All avifauna are protected. The following synopsis portrays life requisites for just high interest birds (Appendix A). Two species (bald eagle and peregrine falcon) are federally listed as endangered and are specifically discussed.

The project and adjacent areas provides substantial valued habitat for a multitude of raptors--turkey vulture, bald and golden eagles, four species of falcons (prairie, American peregrine, Merlin and American kestrel), five species of hawks (red-tailed, Swainson's, rough-legged, Ferruginous and marsh hawks) and four species of owls (screech, great horned, pygmy, and long-eared owls).

Nesting habitat does not exist on the project area for some of these species. However, if a species were to nest, a crucial time period is when the aerie (nest) is occupied. This varies per species but lies between February and mid-August. Generally speaking, aeries represent a critical valued site and need protection from disturbance within a one-half mile

radius. Species specific protective stipulations for aeries are available from the Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service.

Golden eagles are a common yearlong resident of the project area. An aerie territory is utilized by one pair of eagles but may contain several nest sites. No eagle aerie territories are known on the project area.

An active golden eagle nest site is sensitive to disturbance within a one-half mile radius. This buffer zone is ranked as being of critical value to maintenance of the eagle population. Occupancy by the birds is normally between February 1 and July 15. The radius for a buffer zone may need to be increased to one mile if a disturbance were to originate from above and within direct line of sight to the eagle aerie.

The bald eagle is endangered and a winter resident (October through April) of the local area--bald eagles do not nest within the biogeographic area that encompasses the project. To date there are no known high-priority concentration areas or critical valued roost trees for this species on or adjacent to the project. The project area, due to annual use by bald eagles, has been raked as being of substantial value.

Peregrine falcons (federally listed as endangered) and the prairie falcon (relative abundance is common) are yearlong residents of the project and adjacent areas. The American peregrine nests in southeastern Utah where as the Arctic peregrine is only a winter resident. Peregrine and prairie falcons utilize cliff nesting sites. There are no known aerie sites for peregrines or prairie falcons on the project site.

For each falcon their aerie site while being utilized and a one-half mile radius would be ranked as being of critical value to maintenance of their populations. The falcon's period of use at the aerie site spans the spring

and early summer period--prairie falcon, April 15 to June 30; peregrine falcon, March 1 to June 30.

Mourning doves inhabit the project and adjacent areas between May and mid-September each year. They nest throughout most of this period and each pair produces two clutches. The pinion-juniper and riparian ecosystems are ranked as being of high-priority value for nesting. Locally, mourning doves show two peaks in on-nest activity--early July and early August. Successful nesting activities and any water sources are critical to maintenance of the mourning dove population.

The western bluebird is an uncommon summer resident known to inhabit the environs of the biogeographic area that surrounds the project site. It is a cavity nesting specie and nests from the pinion-juniper up into the lower forest habitats of the montane. During winter western bluebirds show elevational and longitudinal migrations; they then utilize all ecosystems associated with the project. It is important to note that trees with cavities located on the project area can be of critical value when utilized by bluebirds.

Fifty-one species of mammals, of which 90 percent are protected, are believed to inhabit the project area (Appendix A). The following synopsis portrays life requisites for just high interest mammals. Only the black-footed ferret has been federally listed as endangered. It will be specifically discussed.

The red bat is a summer resident having a limited distribution within the biogeographic area that surrounds the project site. The animal roosts in riparian and pinion-juniper ecosystems. Such areas represent this animals substantial valued use area. An occasional individual has been known to utilize caves; those individuals could hibernate and remain over winter.

The spotted bat may inhabit the environs of the project area but little is known concerning this specie.

The cottontail rabbit (mountain cottontail inhabits sites lying between 7,000 and 9,000 feet in elevation and the desert cottontail inhabits sites lower than 7,000 feet in elevation) is a yearlong resident of the biogeographic area that surrounds the project site. The entire project area represents a substantial valued use area for cottontails. Their young are born between April and July. This is a crucial period for maintenance of the cottontail population.

The red and gray fox are yearlong inhabitants of the biogeographic area that surrounds the project site. They are pursued due to their fur value. The substantial valued use area for fox would include all ecosystems associated with the project. Locally, almost nothing is known of foxes population dynamics. Without doubt a crucial period for the fox is when they are caring for young in the den. Dens, while being inhabited, are a critical use area.

Many of the members of the family mustelidae are known to inhabit the biogeographic area that surrounds the project site. They are all protected and classified as furbearers--badger, striped and spotted skunks. All of these species are pursued by sportsmen due to their value in the fur market.

The substantial valued use area for badger and skunks spans all ecosystems other than dense forests. Skunks show some affinity for habitats proximal to water, and both species are dependent upon a suitable prey source.

A crucial period for maintenance of all furbearers populations is when they have young in a nest or den. Such sites are critical for reproductive success.

Bobcat, Canada lynx and cougar are known to inhabit the biogeographic area that surrounds the project site. For all of these species a crucial

period for maintenance of their population is when the female has her young secreted at a den site. Such sites are of critical value when being utilized. It is also important that a female accompanied by young not be killed or harassed.

The substantial valued use area for bobcats extends from the cold desert through the submontane and into the montane. The bobcat is normally associated with precipitous terrain, but has been observed in every ecosystem within the aforementioned ecological settings. Their primary prey source is represented by small mammals and birds or any other animal they can catch. It is important to note that bobcats occasionally do kill the young of big game animals.

The substantial valued use area for the Canada lynx is restricted to the montane. Normally, this cat would be expected to only utilize riparian and forested ecosystems. The lynx is similar in predation habits to the bobcat.

The substantial valued use area for the cougar (locally known as mountain lion) generally extends from the submontane into the montane. Due to the dependency of the cougar upon mule deer as a prey source, a ranking of the lion's seasonal distribution parallels that of the deer. This predator/prey relationship results in cougar utilizing environs of the cold desert, also.

Mule deer are inhabitants of the biogeographic area that surrounds the project site. Their substantial valued use area spans all ecosystems extending from the cold desert through the submontane and montane. In some situations deer show altitudinal migrations in response to winter conditions. There are, however, habitats where deer reside on a yearlong basis.

Migration of mule deer from summer range to winter range is initiated during late October. Probably, the annual disturbance of the fall hunting season coupled with changing weather conditions is the initial stimulus. The onset of winter weather reinforces the deer's urge to migrate and continued adverse weather keeps the deer on the winter range.

the animal. These areas are usually inhabited from December through April each year and during years with severe snow conditions portions of the winter range becomes unavailable to deer due to snow depth. On an annual basis, some restricted portions of the winter range have shown concentrated use by the deer; these areas are ranked as being of critical value. Critical valued sites must be protected from man's disturbance when the deer are physically present on the range.

Deer begin their migration back to summer range by May and remain there throughout summer and fall. Summer ranges are ranked as being of high-priority value to mule deer.

Mule deer fawn during the month of June--peak fawning occurs around June 20. The continuum of wildlife ecosystems extending from the pinion-juniper through the shrubland and into the aspen type probably represents the fawning area. All riparian areas are of critical value for fawning and maintenance of the deer population. To date specific areas showing annual use for fawning have not been inventoried. It is probable that such areas exist; they would be ranked as being of critical value to deer. It is important to note that June 15 through July 5 represents a crucial period for parturition.

Rocky mountain elk are inhabitants of the biogeographic area that surrounds the project site. Their substantial valued use area spans all ecosystems extending from the submontane through the montane. Elk do not show as strong altitudinal migration as mule deer do in response to winter conditions, but they do migrate to wintering areas.

Migration of elk from summer range to winter range is initiated during late October. Probably, the annual disturbance of the fall hunting seasons coupled with changing weather conditions is the initial stimulus. The onset of winter weather reinforces the elk's urge to migrate and continued adverse

coupled with changing weather conditions is the initial stimulus. The onset of winter weather reinforces the elk's urge to migrate and continued adverse weather keeps elk on the winter range.

A portion of the project site represents winter range for the Manti elk herd. Winter ranges for elk are all ranked as being of high-priority value to the animal. These areas are usually inhabited from December through April each year. During winters with severe conditions, some portions of the winter range becomes unavailable to elk due to snow depth. Traditionally, some restricted portions of the winter range have shown concentrated use by the elk; these sites are ranked as being of critical value. Critical valued sites must be protected from man's disturbance when the elk are physically present on the range.

Elk begin their migration back to summer range by May and remain there throughout summer and fall. Summer ranges are ranked as being of high-priority value.

Currently, there are no other known high interest wildlife species or their habitat use areas on or adjacent to the project area. It is not unreasonable to suspect that in the future, some additional species of wildlife may become of high interest to the local area, Utah or the Nation. If such is the case, the required periodic updates of project permits and reclamation plans can be adjusted and appropriate recommendations made.

RECOMMENDED FISH AND WILDLIFE MITIGATION PLAN

Andalex Resources Inc. - Tower Division

(Wildcat Coal Loadout)

Mitigation and Impact Avoidance Procedures General to All Wildlife

Wildlife use areas have been ranked into four levels of biological importance. The most valued are the critical areas followed in respective importance by high-priority, substantial and limited valued areas. Impacts to any of these areas requires various levels of mitigation. At a minimum, any project resulting in disturbance to wildland habitats must provide interim revegetation and plans for final reclamation/revegetation. Interim revegetation should target stabilization of top soil storage sties and other raw soil areas. Forage values to wildlife of the seed prescription should be an important issue where wildlife can utilize interim plantings. Final reclamation must consider life requisites (food, water, cover and space) of high interest wildlife that would utilize the area.

Where practicable disturbances to vegetation communities should be kept to a minimum and planned to create irregular edges rather than long smooth edges. Facility placement must incorporate cluster designs and safe corridors for large animal movement. Mining operations should develop as much facility area underground as reasonable.

During the interim of project activities, all hazards to wildlife (i.e., vertical vent shafts, hazardous chemicals, liquid hydrocarbons, etc.) need to

be modified to preclude animal use. Persistent pesticides should not be used.

It is recommended that the company make significant efforts to educate all employees associated with the project of intrinsic values of the wildlife resource. The company has legal and moral obligations to protect the environment; the employee must share in this responsibility.

In order to meet this objective the Division of Wildlife Resources has developed a "Coal Mining and Wildlife" training program that is available for company use. Personnel associated with the project should be advised not to unnecessarily or without proper permits harass or take any wildlife. Young animals or females with young are frequently victims of accidental discovery and harassment or capture. Additionally, personnel traveling to and from the project should not stop their vehicles for purposes of viewing wildlife at short distances. Moving traffic is less disturbing to the animals than traffic that stops and/or results in out-of-the vehicle activity. When the viewing of wildlife is desirable, vehicles should only be slowed, but not stopped. It is especially important that wildlife not be harassed during winter periods, breeding seasons and early in the rearing process.

Exploratory drilling should be limited as much as possible during crucial periods. During winter wildlife are always in a depleted condition. Unnecessary disturbance by man causes them to use up valuable and limited energy reserves which, often times, results in mortality. In less severe cases, the fetus being carried by females may be aborted or absorbed by the animal, thus reducing reproductive success of a population. During breeding seasons, disturbance by man can negatively affect the number of breeding territories for some species of wildlife. Disturbance can also interrupt courtship displays and preclude timely interactions between breeding animals. This could result in reduced reproductive success and ultimate reductions in population levels. And, early in the rearing process, young animals need the

peace and tranquility normally afforded by remote or secluded wildfire. It is also during this crucial period that young animals gain the strength and ability to elude man and other predators. This allows the young animal to develop in relatively unstressed situations and to utilize habitats that are secure from predators. Disturbance by man can compromise this situation and result in abandonment of the young by the female, increased accidents that result in mortality to young animals or increased natural predation.

Hunting and other state and federal wildlife regulations must be adhered to by sportsmen utilizing the project area. Apprehension of wildlife violators has increased by nearly 250 percent during recent years in southeastern Utah.

Mitigation and Impact Avoidance Procedures for Aquatic Wildlife

If ultimate operations are planned or occur that could physically or chemically impact any drainage channel or marshland, detailed reclamation plans along with appropriate state ("Application to Alter a Natural Stream" administered by the Division of Water Rights) and/or federal ("404 permit" administered by Army Corps of Engineers) permits will be required. Where flows will be altered, instream flow needs of fisheries, benthos and channel/habitat maintenance needs to be determined through an acceptable methodology. Also, consumptive uses of water resulting in depleted flows within the Colorado River basin will impact endangered fish species necessitating consultation with the U.S. Fish and Wildlife Service.

Crossing culverts must be installed with gradients less than 0.5 percent and must have a natural bottom and/or devices for reducing stream velocity so that fish migration is not inhibited. Bridge design must consider fish passage needs and riparian habitat protection--clear span bridges are recommended. A reclamation plan for a stream or lake would necessitate high level studies providing for measurement of the physical and chemical characters of the water

channel morphology or lake bottom/shoreline characteristics prior to disturbance.

Adequate precautions must be taken to keep all forms of coal or other sediments contained. They must not be inadvertently deposited in locations where the material could be transported during a precipitation event into a perennial stream. This would include "blow-coal" as fugitive dust from conveyance systems, haulage trucks, railroads or storage piles. Control of larger coal particles from the above sources is equally important. If needed, haulage vessels or storage sites should be covered, or the surface of the coal appropriately sprayed in order to solidify it against wind movement. The impacts of coal or other sediments on aquatic ecosystems are many and varied. Therefore, sediments must be kept out of those systems.

Mitigation and Impact Avoidance Procedures for Terrestrial Habitats

It is recommended that all marshland and riparian ecosystems be maintained or enhanced. A State goal is avoidance of a net loss of these highly productive and unique habitats. All impacts will require mitigation that results in replacement by creation of new habitat. Roads crossing through those areas should do so in a manner that is least damaging to the habitat. Marshlands and riparian ecosystems are ranked as being of critical value and are the most productive sites in terms of herbage and biota produced as compared to other local habitat types. It is probable that a majority of the vertebrate wildlife that inhabit the project area make some use of riparian or marshland areas.

It is important to note that roads and other surface facilities to be constructed should as far as practicable be sited where they will not compromise wildlife or their use areas. Also, surface facilities, including

roads, should be screened if possible from wildlife use areas by vegetation or terrain.

In situations where wildland habitats have been or will be disturbed, reclamation is required. Also, there are sites where development or enhancement of wildland habitats through vegetation treatments and/or seedings or transplants of seedlings could benefit wildlife. Seedings should take place in the fall after a permanent killing frost has occurred. Seedling transplants should occur in the spring just after snow melt in order to best advantage local soil moisture conditions.

Temporary control of rodents may be required to ensure a successful rangeland treatment. It is recommended that the State Department of Agriculture be consulted in this area of concern. Poisoned oats are the most common and acceptable method for rodent control; however, only licensed persons may apply the treatment.

Currently, there are some new concepts in methodology for revegetation that are being successfully implemented in other parts of the nation and world. One promising method is a procedure where a large scoop removes, from a natural and stabilized site, a small area of earth intact with vegetation and subsurface soils for placement on a site to be restored. This same procedure can be utilized when disturbing pristine sites, except that the native vegetation is stored for use in latent reclamation. Another meritorious method for stimulating natural revegetation, in combination with other reclamation techniques, is to plan facility developments so that islands of natural, native vegetation remain. This will allow for natural vegetation to spread from the islands. These techniques can also be useful for enhancement of poor quality sites that currently exist on the mine plan area.

There are also new specialized techniques coming to the forefront for stabilization of problem sites such as roadbanks and steep slopes. It is

important that these sites be promptly and permanently revegetated in order to reduce siltation into local hydric ecosystems. This will lessen damage to aquatic wildlife populations and habitats from siltation.

As a service and also to ensure that the needs of wildlife are met, the various expertism within the Division of Wildlife Resources are available to the company for consultation. For the most part, Larry Dalton, Resource Analyst, for the Southeastern Regional office at 455 West Railroad Avenue in Price, Utah 84501 (phone 801-637-3310) will coordinate any needed contacts. Richard Stevens, Wildlife Biologist, at the Great Basin Research Center, Box 704, in Ephraim, Utah 84627 (phone 801-283-4441) is available for consultation and site specific analysis concerning species for vegetation plantings, timing and technique to achieve the best results.

In instances where revegetation projects are to be planned over refuse areas, heavy metal uptake by the plants must be evaluated. It is recommended that the company initiate an appropriate long-term monitoring program to determine the magnitude and resolutions, if needed, for this problem.

Mitigation and Impact Avoidance Procedures for Amphibians and Reptiles

Enhancement or development of habitats that provides a diversity of vegetation will benefit amphibians and reptiles. It is important to note that all of these species are protected by Utah law. Due to the myriad of myths that surround these animals, it is urged that individual specimens not be destroyed. This is especially true for snakes since they are a valuable component of the ecosystem.

Snake dens are ranked as being of critical value to the population and are protected by law. If a den is located, it should be reported to the Utah Division of Wildlife Resources. Snake dens can be moved, but only with intensive efforts that may take a year or more (snakes are caught and removed

in the spring and fall). Thus, construction of facility developments may take place in denning locations if there is sufficient lead time to relocate the occupants.

Mitigation and Impact Avoidance Procedures for Avifauna

It is recognizable that development and operation of a mining project will in some cases negatively impact many avian species. Physical destruction of habitats and continual disturbance that makes other habitats unavailable or less desirable to an individual bird are typical. It is also true that impacts that are negative to one specie may be beneficial to another specie. It is recommended that the Company plant native and/or exotic (ornamental species are acceptable) berry producing shrubs and other desirable seed producing plants around surface facilities. This will provide food and cover for many of the smaller species of birds, resulting in enhancement of their substantial and high-priority valued habitats. This action would also mitigate for disturbances and destruction of avifauna habitats at other sites associated with project operations.

It is important to note that the nests of all avifauna when active and their eggs are protected by federal (Federal Migratory Bird Treat Act) or state laws (Utah Code 23-17-1 and 23-17-2). Note that raptor stick nests are protected regardless of being actively occupied or not. All avifauna utilize a nest during their reproductive process. Dependent upon the species, some nests are well developed while others may be represented by only a scrape on the ground. These sites when being utilized are critical to maintenance of individual bird populations. Each of the species has a specific crucial time period in which their nest would be occupied. It is during this crucial period that the nest must be protected from disturbance.

Riparian and marshland areas need to have complete protection from

disturbance between mid-March and mid-June due to the crucial spring migration and nesting season of waterfowl. Disturbance should be significantly limited from mid-June through mid-October in order to protect the high-priority habitat values for brooding, moulting and fall migration of waterfowl.

Several species of raptors frequent the project area. Their nests when active should not be disturbed, and abandoned stick nests are never to be damaged. Every effort should be made to eliminate man's disturbance within visual sight or one-half mile radius of an active raptor nest. Termination of man's use of a site would not be required where eagles or falcons constructed their nest after mining had been initiated. This would demonstrate an individual bird's willingness to tolerate mining activities and the associated disturbance by man.

Roost trees for bald eagles, if located, must not be disturbed or destroyed. Similarly, activities planned for high-priority concentration areas of bald eagles must be designed and implemented so that they are not of significant disturbance to the birds.

As a general comment, whenever active raptor nests are observed or roost trees for bald eagles located, they need to be reported to the Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service.

All electrical power line support towers and other transmission facilities must be designed to safeguard birds. The guidelines set forth in "Environmental Criteria for Electric Transmission System" published by the USDA and USDI in 1970 and/or the REA Bulletin 61-10 "Powerline Contacts by Eagles and Other Large Birds" are available for company review. It is also recommended that placement of utility poles over flat or rolling terrain be planned so that they are out of view of roads or at least one-quarter mile away from any roads. This will lessen opportunity for illegal killing ("plinking") of these valuable birds. Note that the poles can serve as

predator-prey relationship. One species of animal may represent a prey source for other species. Therefore, it is important that project operations be designed and implemented so as to not unnecessarily disturb wildlife. Special attention needs to be made to minimize destruction of their habitats.

Haulage of coal between the various mine projects and distribution points should be planned so that impacts to wildlife are lessened. Special concern is elicited by haulage of coal through wintering or other concentration areas for big game. It is recommended that the Company cause coal haulage personnel to use extreme caution so that accidental collisions between motor vehicles and big game are reduced. Without doubt, a reduction in speed would alleviate this problem.

At present the most successful and cost effective technique for reducing deer-highway mortality is a system of warning reflectors. This system (manufactured by Strieter Corporation, 2100 Eighteenth Avenue, Rock Island, Illinois 61201 and known as "Swareflex") is only of value at night time. But, it is during darkness that 90% of deer-highway mortality occurs. Strieter Corporation describes the effect of the reflector system as follows:

> "The headlights of approaching vehicles strike the wildlife reflectors which are installed on both sides of the road. Unnoticeable to the driver, these reflect red lights into the adjoining terrain and an optical warning fence is produced. Any approaching wildlife is alerted and stops or returns to the safety of the countryside. Immediately after the vehicle has passed, the reflectors become inactive, thereby permitting the animals to cross safely".

Installation of a wildlife warning reflector system, a reduction in speed of coal-haulage trucks or other mine related traffic, and increased awareness of wildlife values by mine associated employees should result in a reduction of deer-highway mortality problems.

In instances where conveyors, slurry lines or other linear, above-ground structures having potential to be a barrier to big game

suitable hunting perches for raptors. In some instances poles can result in an extension of raptor hunting territories, which would represent a beneficial impact.

During the crucial period of December through February, spruce-fir forests and aspen forests need to be protected from man's disturbance so that blue grouse and ruffed grouse will not be impacted. Destruction of these wildlife habitats at any time of the year need be minimized due to their value to wildlife.

During the spring period (mid-March through mid-June) care needs to be taken that male blue grouse are not disturbed or precluded from establishing breeding territories. Similar precautions need be taken for male ruffed grouse (March through May) in the area of drumming logs.

Mature trees with natural cavities and dead snags need to be protected for use by cavity nesting birds. Trees with such a character are ranked as being of critical value to cavity nesting birds. The project should be planned so that along lake and stream margins or within 500 feet of forest openings three cavity/snag trees per acre are left standing. In dense forested areas two cavity/snag trees per acre must be retained.

Mitigation and Impact Avoidance Procedures for Mammals

The lodges, nests and dens of all mammals or roosts in the instance of bat-like mammals must be protected and represent a critical use area. A crucial period for the aforementioned sites is when they are occupied. Additionally, many species of mammals develop food caches in order to carry individual animals or family groups through periods when they cannot forage. Such sites are of critical value to maintenance of their populations and if located should not be destroyed or subjected to regular disturbance by man.

It is important to realize that within natural ecosystems there exists a

movement are to be developed, uninhibited passage opportunity must be provided. Passage opportunity must be provided within reasonable distance of any point where animals encounter the structure. A combination of passage modes is most practicable. A majority length of the structure should be either sufficiently elevated for underpassage or lowered so that animals can jump over. Then strategically located passage structures (sags represented by buried segments, humps represented by elevated segments or overpass ramps) should be placed in areas that remain a barrier.

Underpassage opportunities for animals, including humps, must consider behavior of the target animal species, snow accumulation and vegetation growth as it may influence the passage window. Suggested clearances are as follows
(Note, that the greatest clearance is recommended where snow accumulation is a factor): elk, 5.9 to 9.8 feet; deer, 1.6 to 3.3 feet; moose, heights exceeding 5.9 feet; wild sheep, (Ovis spp.), 4.9 to 7.8 feet; bison, heights exceeding 6.8 feet.

Humps or sags should extend along the structure as far as possible and overpass ramps should be designed as circular natural appearing mounds bisected by the structure. Width requirements probably vary with species, but 10 feet is recommended and side slopes could vary from 20% to 80%, since big game typically negotiate similar natural conditions.

Regardless of passage mode, consideration must be given to development of acceptable habitat on either side of the structure. This will enhance the probability that animals will make use of the crossing opportunity.